

CLAIMS

1. A method of joining two silicon parts, comprising plasma spraying silicon across a seam separating said two silicon parts to form a coating on adjacent surface areas of said two silicon parts.

5 2. The method of Claim 1, wherein the parts are subjected to atmospheric pressure during said plasma spraying.

3. The method of Claim 1, wherein portions of the parts adjacent the seam are held at a temperature of no more than 500°C.

4. The method of Claim 3, wherein said temperature is no more than 200°C.

10 5. The method of Claim 1, wherein said plasma spraying includes injecting silicon powder into a plasma of a gas.

6. The method of Claim 5, wherein said powder comprises particles having diameters in a range of 15 to 45µm.

15 7. The method of Claim 5, wherein said powder comprises particles of virgin polysilicon.

8. The method of Claim 1, wherein principal surfaces of said two parts are perpendicular to each other at said seam.

9. The method of Claim 8, wherein a bevel is formed in at least one of said parts adjacent to said seam.

10. The method of Claim 9, wherein another of said parts does not have a bevel adjacent to said seam.

11. The method of Claim 1, wherein a bevel is formed in at least one of said parts adjacent to said seam.

5 12. The method of Claim 1, wherein a hole passes through a first one of said parts and said second one of said parts is disposed within hole and wherein said plasma spraying forms respective silicon layers contacting said first and second parts on opposite ends of said hole.

13. A method of repairing a surface defect in a surface of silicon member comprising plasma spraying silicon to cover said surface defect.

10 14. The method of Claim 13, including a prior step of mechanically enlarging said surface defect.

15. The method of Claim 13, including a subsequent step of mechanically smoothing said plasma sprayed silicon to be level with said surface.

15 16. A silicon structure, comprising:
a first silicon part;
a second silicon part disposed adjacent to said first silicon part along a seam; and
a layer of silicon bonded to both of said first and second silicon parts and bridging said seam.

20 17. The silicon structure of Claim 16, wherein said layer of silicon comprises a layer of plasma sprayed silicon.

18. The silicon structure of Claim 16, wherein said each of said first and second parts

comprises silicon selected from the group consisting of virgin polysilicon, Czochralski monocrystalline silicon, Czochralski polysilicon, and cast polysilicon.

19. The silicon structure of Claim 10, wherein principal surfaces of said first and second silicon parts extend perpendicularly to each other at said seam.

5 20. A silicon substrate support fixture, comprising:
first and second silicon bases each having mortise holes formed therein;
a plurality of legs comprising virgin polysilicon, having teeth cut therein for supporting
a plurality of substrates in parallel relationship, and inserted into said mortise holes to form
respective seams between respective pairs of said bases and said legs; and
10 layers of silicon bonded to said bases and legs across respective ones of said seams to
join said legs to said bases.

21. The fixture of Claim 20, wherein said layers of silicon comprise layers of plasma sprayed silicon.

15 22. The fixture of Claim 21, wherein each of said bases comprises silicon selected from
the group consisting of virgin polysilicon, Czochralski monocrystalline silicon, Czochralski polysilicon, and cast polysilicon.

23. The fixture of Claim 20, wherein said mortise holes pass through said bases and said layers of silicon are disposed on both sides of said bases for each of said mortise holes.